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HICKORY CURCULIOS OF THE GENUS *CONOTRACHELUS*
(Coleoptera: Curculionidae)

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During 1944 and 1945 W. C. Pierce and C. B. Nickels, of the Bureau of Entomology and Plant Quarantine, collected large series of an undescribed species of *Conotrachelus* which had been found breeding in shoots of pecan trees in Louisiana. In this paper the new species is described, and the chief facts regarding the habits and distribution of several related species are summarized. Most statements are based on specimens I have examined, and now contained in the National Museum Collection. The characters used in the key for separating *affinis* and *hicoloriae* were taken from Schoof's valuable paper (The genus *Conotrachelus* . . . in the north-central United States, Ill. Biol. Monog., vol. 19, No. 3, 1942).

Including *pecanae*, described as new in this paper, six North American species of *Conotrachelus* are known to be associated with *Hicoria* (*Carya*). A seventh species, *juglandis* Leconte, the butternut curculio, has been recorded from hickory a few times, but its occurrence on plants other than *Juglans* is probably accidental or exceptional, and it is not, therefore, included here. *C. juglandis* can usually be recognized by the combination of fine, sparse abdominal punctures and a very prominent, black crest on each elytron at the middle of interval 3.

The hickory *Conotrachelus* all belong to Schoof's group 1¹ and, both by morphology and habits, form three sections, the first represented by *elegans* alone (in galls), the second by the very closely related pair, *affinis* and *hicoloriae* (in nuts), the third by the almost equally close *aratus*, *tibialis*, and *pecanae* (in shoots and twigs). It may be mentioned that, in a more comprehensive treatment, each of these sections would

¹In the fauna of the United States group 1 includes those species having divergent tarsal claws and, nearly always, bidentate femora, and lacking a median, longitudinal furrow on the apical half of the pronotum.

include one or more additional species, none of which, however, is yet known to attack *Hicoria*. Taken together the six hickory *Conotrachelus* range over the eastern half of the United States west to about the 100th meridian, and from southern Canada to Texas. Two or more species frequently occur in the same general region, and at French Creek, W. Va., Brooks found five of the six—*elegans*, *affinis*, *hicatoriae*, *aratus*, and *tibialis*. Species belonging to the same section have occasionally been taken at the same time and place under very similar or even (apparently) identical conditions, a rather striking circumstance in view of their exceedingly close morphological affinities. Examples of such associations are the following: ♂ ♀ *aratus* and ♂ ♀ *pecanae* at each of four localities in Louisiana, all reared from larvae in pecan shoots by W. C. Pierce, the shoots from each locality taken from the same pecan orchard; ♂ ♀ *tibialis* and ♂ *aratus* at French Creek, W. Va., reared by Brooks from *Hicoria* twigs and petioles; one ♂ and one ♀ (probably reared from nuts of *Hicoria ovata*), Durham, N. C., all pin-label data identical, the male belonging to *hicatoriae*, the female to *affinis*; ♂ ♀ *tibialis* and ♀ *aratus*, at Mendenhall, Miss., April 4, 1911, J. E. Boggan, S. 3042; ♂ ♀ *aratus* and ♂ ♀ *pecanae*, at Tallulah, La.

Although there can be scarcely any doubt that the segregates interpreted as species in this paper are separate, natural entities, their limits are fluctuating and hazy, and it is more than likely that a few misidentifications, chiefly of female specimens, are recorded in the following pages. The most reliable external specific differences are found in the secondary sex characters of the males. The sexes are usually separable by differences in the uncus—the hooklike or spine-like process at the apex of each tibia (figs. 26, 27). In the females of all six species, all the unci are simple, but in the males of all, except in some individuals of *affinis*, the hind tibial uncus is dentate (both mid- and hind unci dentate in *elegans*). In *affinis* (♂) the hind uncus is simple in some specimens, feebly dentate in others. Another, but not very dependable, sex difference is found on the intercoxal part of abdominal sternite 1, this area often being distinctly convex in the female; slightly concave, subplanate or feebly convex in the male. In *affinis* the sex of some specimens cannot always be determined by any external character, except by the structure of the dorso-apical surface of the abdomen, the male (as in all species of *Conotrachelus*) having two visible semi-sclerotized terminal tergites, the female only one. To expose these tergites an elytron must be lifted, or, in fresh and flexible specimens, the abdominal apex bent down.

KEY TO SPECIES OF CONOTRACHELUS ASSOCIATED
WITH HICORIA

1. Abdominal sternites 1-4 coarsely and densely punctate (fig. 11). *Male*.—Both mid- and hind unci dentate; proximal tooth of forefemur well developed; sides of aedeagus not so faintly emarginate toward apex (fig. 28). *Female*.—Rostrum relatively long and slender, rather feebly arcuate (figs. 2 and 13); distal tooth of forefemur usually longer and more slender (fig. 20). In galls..... *elegans* Say

The numerous specimens here referred to *elegans* display a great deal of variation in external characters; the shape of the aedeagus, however, is nearly constant in the 15 males dissected.

Specimens examined from Ontario, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, West Virginia, South Carolina, Florida, Alabama, Mississippi, Tennessee, Louisiana, Texas, Kansas, Missouri, Iowa, Illinois, Michigan. Schoof 1942, p. 82, adds Nebraska, Indiana, Ohio, North Carolina.

Reared specimens as follows:

Pennsylvania.—West Chester, July 8, 1908, *Phylloxera* gall on hickory.

Indiana.—Mount Vernon. From galls, "*P. caryaecaulis* [*Phylloxera*].

Louisiana.—Baton Rouge, May 1, 1922, T. H. Jones. From *Phylloxera* galls.

Texas.—Victoria, May 3, 1907, J. D. Mitchell; from *Phylloxera devastatrix* galls on *Hicoria pecan*. Victoria, April 26, 1909, May 7, 1907, and June 13, J. D. Mitchell; from pecan leaf galls. Victoria, June 15 and June 27, 1915, J. D. Mitchell; from pecan galls. Victoria, May 21, 1909, J. D. Mitchell; in leaf galls.

Locality not stated.—In hickory gall.

Abdominal sternites 1-4 less (in some species much less) coarsely and densely punctate (figs. 8-10). *Male*.—Only hind unci dentate (and in some specimens of *affinis* none of the unci dentate); proximal tooth, in some species, feebly developed or obsolescent; aedeagus, except in *hicoriae*, with distinct side emargination (figs. 16, 17, and 29-47). *Female*.—Rostrum not at the same time so long and slender (figs. 1, 3, 12, 14, 15); distal tooth of forefemur usually stouter (figs. 21, 22). Not in galls..... 2

2. Larger species (up to 7 mm.) with conspicuous, postmedian elytral band and more prominent elytral carinae (figs. 1, 5, 18); prothorax a little longer, its dorsal bosses, impressions,

and median carina usually more pronounced (fig. 5); general punctation on abdominal sternites 1-4 fine and sparse or, if coarser and denser, the punctures are shallow and rather vaguely defined (fig. 8); abdominal sternite 5 without, or with feeble, setigerous tubercle each side near apex. - Female with rather long and stout rostrum (figs. 1, 12); male with proximal tooth of forefemur usually well developed. In nuts

Smaller species (5.8 mm. or less) with less conspicuous elytral band (figs. 4, 6, 7) and less prominent elytral carinae; punctation on abdominal sternites usually coarser and denser, the punctures as a rule more sharply defined (figs. 9, 10); abdominal sternite 5 nearly always with a setigerous tumidity each side near apex, this sometimes low and inconspicuous, but often in the form of a small but distinct tubercle. Female rostrum shorter and rather more strongly arcuate (figs. 3, 14, 15); male with proximal tooth of forefemur often feeble or obsolete. In shoots, petioles, and twigs

3. Larger (6-7 mm.). *Male*.—Hind uncs feebly or not dentate; aedeagus with a broad apical process, i.e., sides of aedeagus emarginate near apex (fig. 16). *Female*.—Antennal scape failing to attain head by a distance of at least half and usually two-thirds the length of first funicular segment

affinis Boheman

Specimens seen from New York, New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, Arkansas. A female from Durham, N. C., belongs to *affinis* by antennal and rostral characters, though a male, bearing identical pin-label data, must be referred to *hicoloriae*. Schoof, 1942, p. 67, records *affinis* also from Illinois and the District of Columbia.

Reared specimens as follows:

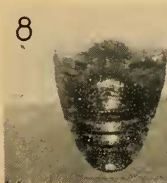
West Virginia.—French Creek, September 15-16, 1920, F. E. Brooks; from larvae in immature nuts of *Hicoria ovata* (shagbark hickory). French Creek, September 9-12, 1920, F. E. Brooks; issued from earth beneath infested shagbark hickory nuts.

North Carolina.—Durham, August 19, 1943, J. A. Beal; host, *Carya ovata*. (Presumably reared from nut.)

PLATE 5

(Photographs by Mareel L. F. Foubert)

Fig. 1, *affinis* ♀, French Creek, W. Va.; fig. 2, *elegans* ♀, West Point, N. Y.; fig. 3, *pecanae* ♀, Williams, La.; fig. 4, *elegans* ♀, West Point, N. Y.; fig. 5, *hicoloriae* ♀, Williams, La.; fig. 6, *tibialis* ♂, Jefferson Barracks, Mo.; fig. 7, *pecanae* ♂, Williams, La.; fig. 8, abdominal sternites of *hicoloriae* ♀, Prince Georges County, Md.; fig. 9, same of *aratus* ♀, Natchitoches, La.; fig. 10, same of *pecanae* ♀, Williams, La.; fig. 11, same of *elegans* ♀, West Point, N. Y.



Smaller (4.4-7 mm.). *Male*.—Hind uncus distinctly dentate; aedeagus without apical process, i.e., sides scarcely emarginate apically (fig. 17). *Female*.—Antennal scape failing to attain head by a distance less than half the length of first funicular segment *hicoloriae* Schoof

Specimens seen from New Jersey, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Florida, Louisiana, Texas, Kansas, Arkansas, Missouri, Iowa, Indiana. Also (Schoof, 1942, p. 71) from Illinois.

Biological data on reared specimens as follows:

Missouri.—St. Louis, August 10, 1872; from green hickory nut.

North Carolina.—Durham, August 19, 1943, J. A. Beal; host, *Carya ovata*. (Presumably reared from nut.)

Louisiana.—Baton Rouge, July 26, 1934, C. E. Smith; destroyed half the pecan nuts on several 11-year-old trees; larvae feed both on hull and kernel. Williams, September 15-19, 1945, W. C. Pierce; from larvae in pig nuts. Sligo, Williams, Shreveport, Melrose, and Robson; adults from these five localities in Louisiana reared by W. C. Pierce, on several dates during September 1945, from larvae in pecan nuts.

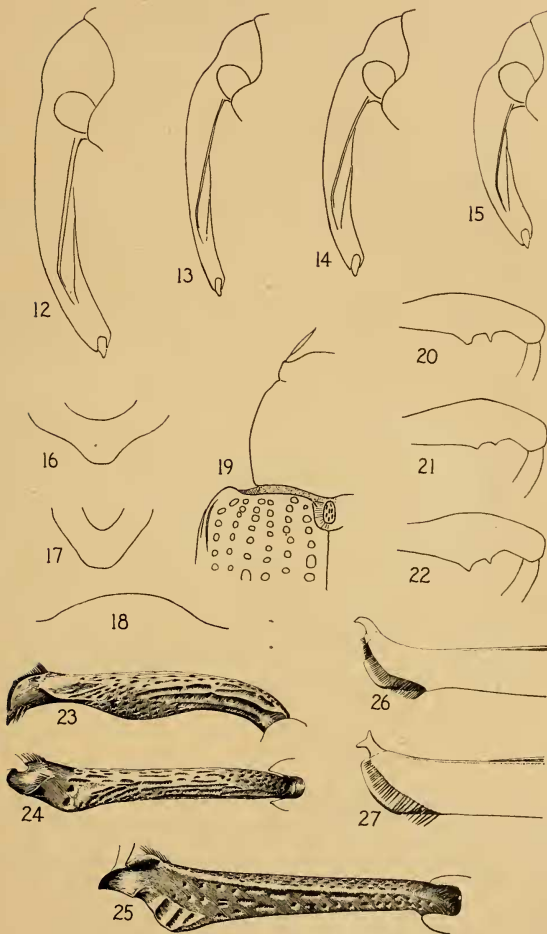
Texas.—Victoria, August 19, 1909, McMillan; bred from pecan. (Schoof, 1942, p. 71, adds Victoria, J. D. Mitchell; bred from fallen pecan nuts.)

4. Length, 4.3-5.7 mm. Body and rostrum slightly more slender (fig. 14); elytral humerus a little more advanced, at least in female (fig. 19). Foretibia in both sexes with its anterior face unmodified and subevenly sculptured and setose from base to apex, the apical ridge bearing the fringe of spinules less prominent. *Male*.—Aedeagus with deeper and more abrupt lateral emarginations, the apical lobe broad (figs. 29-35); denticle on uncus preterminal (fig. 27) *aratus* Germar

PLATE 6

(Figures 23 to 27 drawn by Arthur Cushman)

Fig. 12, rostrum of *hicoloriae* ♀, Williams, La.; fig. 13, same of *elegans* ♀, West Point, N. Y.; fig. 14, same of *aratus* ♀, Natchitoches, La.; fig. 15, same of *pecanae* ♀, Williams, La.; fig. 16, tip of aedeagus of *affinis*; fig. 17, same of *hicoloriae*; fig. 18, profile of costa at middle of elytral interval 3 of *hicoloriae* ♀, Williams, La.; fig. 19, *aratus* ♀, Natchitoches, La., showing advanced humerus; fig. 20, *elegans* ♀, West Point, N. Y., posterior face of right forefemur; fig. 21, same of *pecanae* ♀, Williams, La.; fig. 22, same of *aratus* ♀, Natchitoches, La.; fig. 23, *pecanae* ♂, Williams, La., anterior face of foretibia; fig. 24, upper surface of same; fig. 25, *tibialis* ♂, southern Illinois, upper surface of foretibia; fig. 26, *pecanae* ♂, Williams, La., apex of hind tibia showing structure of uncus; fig. 27, same for *aratus* ♂, Natchitoches, La.



Specimens seen from Connecticut, New York, Maryland, West Virginia, North Carolina (Alabama—a very stout female from Mobile County is doubtfully referred to *aratus*), Mississippi, Louisiana, Texas, Kansas, Iowa.

The principal biological data accompanying specimens seen are:

West Virginia.—French Creek, May 27, 1920, F. E. Brooks; beetles jarred from hickory branches in the shoots of which they were ovipositing.

Mississippi.—Wiggins, March 24, 1929; hickory petioles. Wesson, June 16, 1926, O. M. Chance; from larvae, pecan [? pecan shoots or petioles]. Poplarville, June 26, 1926, J. F. Lee; from larva, pecan [pecan shoots or petioles].

Louisiana.—Tallulah, Mound, Port Hudson, Monroe, Lake Providence, and Natchitoches; adults from these six localities reared by W. C. Pierce, May and June 1945, from larvae in pecan shoots.

Locality not stated.—In petiole of hickory.

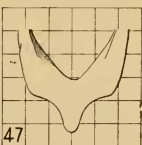
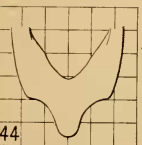
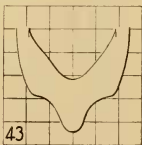
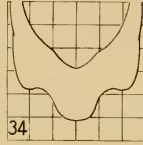
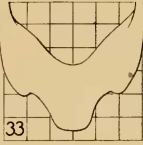
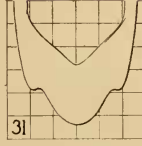
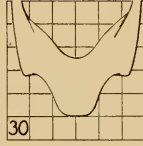
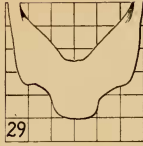
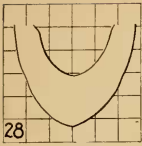
Body and rostrum a little stouter (figs. 3, 15); elytral humerus usually less advanced. *Male*.—Foretibia with its upper surface more or less flattened near apex and there with its anterior face produced into a rounded, shelflike expansion, the surface beneath the expansion subimpunctate and subglabrous, remainder (basal three-fourths) of anterior face rugosocarinate (figs. 23-25); aedeagus with lateral emargination less abrupt (figs. 36-47); hind uncus with denticle terminal or preterminal. *Female*.—Anterior face of foretibia setose and rather roughly sculptured (usually more roughly so than in *aratus*) except near apex where, usually, the setae are abruptly less numerous and the surface smoother and more shiny; apical ridge bearing the fringe of spinules usually more prominent

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PLATE 7

(Tips of aedeagi; drawn by Arthur Cushman)

Fig. 28, *elegans*, Plummer Island, Md.; fig. 29, *aratus*, Beltsville, Md.; fig. 30, *aratus*, Poplarville, Miss.; fig. 31, *aratus*, Tallulah, La.; fig. 32, *aratus*, Tallulah, La.; fig. 33, *aratus*, West Point, N. Y.; fig. 34, *aratus*, Tallulah, La.; fig. 35, *aratus*, Natchitoches, La.; fig. 36, *tibialis*, southern Illinois; fig. 37, *tibialis*, Mendenhall, Miss.; fig. 38, *tibialis*, French Creek, W. Va.; fig. 39, *pecanae* No. 192, Mound, La.; fig. 40, *pecanae* 287, Grand Bayou, La.; fig. 41, *pecanae* 402, Williams, La.; fig. 42, *pecanae* 229, Lake Providence, La.; fig. 43, *pecanae* 58, Williams, La.; fig. 44, *pecanae* 401, Grand Bayou, La.; fig. 45, *pecanae* 190, Mound, La.; fig. 46, *pecanae* 19, Williams, La.; fig. 47, *pecanae* 399, Grand Bayou, La.



5. Larger (4.5-5.75 mm.); pronotal sculpture a little more regular (fig. 6). *Male*.—Foretibia more strongly modified (fig. 25); denticle on uncus preterminal (about as in fig. 27); apical lobe of aedeagus nearly always broader (figs. 36-38)

tibialis Schoof

Specimens seen from New York, West Virginia, South Carolina, Florida, Alabama, Mississippi, Michigan, Iowa, Missouri, Kansas, Arkansas. Also (Schoof, 1942, p. 92) from Massachusetts and Illinois. The female from New Iberia, La., placed with *tibialis* by Schoof, is here transferred to *pecanae*.

A male from French Creek, W. Va., July 12, 1919, F. E. Brooks, was, according to accession-number records, reared from larva in base of a hickory leaf stem.

- Smaller (3.8-5 mm.); pronotal sculpture a little rougher (fig. 7). *Male*.—Foretibia less modified (figs. 23, 24); denticle on uncus terminal (fig. 26); apical process of aedeagus more slender (figs. 39-47). Louisiana and Texas — *pecanae*, new species

In the apparent absence of qualitative differences between the females of *pecanae* and *tibialis*, several female specimens of each species have been identified chiefly by locality—*pecanae* not yet having been recognized from outside Louisiana and Texas, whereas no specimen definitely referable to *tibialis* has been found in either of these two states. It is probable, however, that the ranges of *pecanae* and *tibialis* actually overlap, although available evidence does show rather conclusively that the main body of each population is restricted to its own region—*tibialis* to the North and East, *pecanae* to the South and West. Such geographic subsolation, in connection with the close morphological likeness, may indicate racial, rather than specific, distinctness; chiefly because of the rather well-defined male differences, the two populations are treated here as distinct species. Whatever their status, they are clearly separate, though unstabilized, natural groups.

***Conotrachelus pecanae*, new species**

(Figs. 3, 7, 10, 15, 21, 23, 24, 26, and 39-47)

Length 3.8-5 mm., most specimens between 4.2 and 4.6 mm. Body above rather dull to moderately shiny, black or piceous black when mature, here and there usually with some indefinite, dull red-brown areas, teneral specimens dull red brown with darker blotches; midline of rostrum above brighter red brown. Prothorax above sparsely setose, the sculpture plainly visible. Scutellum convex, prominent. Elytra each with 4 low carinae, the median portion of carina on third interval only slightly higher than the other carinae; elytral vestiture consisting

of very small, appressed, setiform scales which are irregularly distributed and do not entirely conceal derm except in places, postmedian band evident but not conspicuous. Fore coxae contiguous. Mesosternum subtruncate anteriorly, not depressed. Abdomen black, shiny, strongly punctate. Femora bidentate, the proximal tooth of at least forefemur (δ) very small or obsolete. Hind tibial uncus (δ) with a denticle at apex, the denticle appearing as an upturned prolongation of the uncus itself, rather than as a separate tooth (fig. 26).

Head densely punctate, and with sparse to dense, usually white or intermixed white and yellow-brown, setiform scales which as a rule are sparser along median line and wanting in a small spot each side; interocular puncture deep. Rostrum stout, subevenly, distinctly curved, about as long as head and prothorax (δ) or slightly longer (η) (measured along a straight line between most advanced point on closed mandible and anterior margin of eye at middle of rostrum), thickest at base and gradually thinner to apex, apical section usually a little wider than basal section, especially in female, dorsal profile of rostrum forming a usually obtuse angle with head; dorsum (δ) with 3 carinae from base to near antennal socket, the median carina broader, rounded at summit, and separated each side from the submedian carinae by an irregularly punctate groove, the surface anterior to the carinae finely, densely, subconfluently punctate and often somewhat flattened; dorsum (η) with similar but usually shorter and less prominent carinae and shallower grooves, the apical surface finely, rather densely punctate, the punctures separated in part but, especially toward sides, more or less confluent; side of rostrum (δ , η) shiny to subopaque, carinaterugose; setae on rostrum chiefly confined to basal three-fourths, sometimes rather dense, but not concealing the sculpture, transversely directed, sometimes unicolorous, but usually a mixture of whitish to yellow brown; frequently there is a small cluster of broader, white setiform scales lying partly on submedian carina at about basal third. Antennal socket at about one-fourth from apex (δ), at about one-third (η), funicular joint 1 stouter and longer than 2.

Prothorax transverse (about 7 wide to 5.5 long), sides diverging from base to about middle, then more strongly converging to the apical constriction; dorsum convex, its punctures dense, rather coarse, somewhat irregular in size and spacing and here and there often longitudinally confluent, the surface each side in front of middle commonly with a shiny boss posterior to which is often a shallow impression, and behind each impression sometimes a feeble boss, midline usually with at least a trace of median carina beginning about middle and extending a variable distance forward, rarely extending a short distance behind the middle, apical fourth of pronotum depressed and usually more or less distinctly red brown; setae on disc fine, sparse, curved, subappressed; lateral line often well-defined basally, where it is composed of broader, denser, usually white or yellow-white, appressed setiform scales, the line usually interrupted at about basal fourth and thence

to apex more or less diffuse, and sometimes scarcely traceable. Scutellum subovate to narrowly elliptical, sometimes bare, but usually with a few, fine setae. Elytra nearly 3 times as long as prothorax, base feebly bisinuate; carina on interval 3 usually twice interrupted, the basal interruption occasionally; the postmedian interruption more frequently, only partial; carina on interval 5 often complete, sometimes interrupted or subinterrupted toward base, or about middle, or at both places; carinae on 7 and 9 usually complete; vestiture varying in color in different specimens, and on different areas on same specimen, yellow brown of several shades often predominating, commonly scales of various shades of yellow brown are intermixed with dingy white and yellow-white scales, the pure white scales on many specimens chiefly confined to irregular patches on the carinate intervals, to a short streak at base of interval 3, and a small patch at base of interval 5, the vestiture denser on flat than on carinate intervals, densest and usually concealing the surface (except on the odd intervals) in the postmedian band; postmedian band dingy yellow white, yellow brown or dull red brown, often with a sparse sprinkling of white and yellow-white scales. Metasternum (δ) with surface featuring a mid- and hind coxa not distinctly sulcate. Abdomen usually dull red brown at sides of last 3 sternites, setae fine and sparse generally, denser and broader at sides of last 3 sternites, punctures on last sternite denser and smaller than on rest of abdomen; sternite 1 in female shiny throughout, and transversely convex at middle, but in male subplanate or vaguely impressed, and more or less dull, medially; sternite 5 usually with a small tubercle each side toward apex. Legs sometimes almost entirely red brown, but usually the femora and, to a lesser degree, the tibiae more or less extensively suffused with blackish, the dark color sometimes covering most of forefemur except apex, and a considerable part of mid- and hind femora; vestiture on mid- and hind femora often denser apically and forming a band across anterior face at apical third, on forefemur forming a diffuse annulus. Spinules at tibial apices golden to fuscous, apparently averaging darker than in *tibialis* and *aratus*. Femoral teeth in female distinct though often small on fore- and midlegs; in male, the proximal tooth on forefemur is at most feebly developed, and not infrequently absent, and in many specimens the proximal tooth on fore- and midfemora and sometimes on all 3 pairs, is represented by a feeble, subangular prominence; foretibia (δ) with lower edge broadly bisinuate, the anterior face with a dorso-apical shelflike prominence (figs. 23, 24); foretibia (φ) with the apical edge (which bears the terminal row of spinules) usually thickened and shiny, the anterior face of tibia, just basad of apical edge, often with a feeble, oblique carina, dorsal edge of tibia often notched near apex.

Type.—Male, United States National Museum Cat. No. 57970.

Type locality.—Williams, La., June 13, 1945, W. C. Pierce. Under rough bark on pecan trees.

The type series consists of the type and 242 paratypes, selected from about 800 specimens.

Distribution.—Louisiana: Williams (88 males, 171 females): VI-13-45, under rough bark on pecan trees, W. C. Pierce; II-19-46, under pecan trees, W. C. Pierce; Marston orchard, III-17-45, III-29-45, IV-13-45, and IV-25-45, overwintered adults on pecan trees, W. C. Pierce; Marston orchard, larvae in pecan shoots, IV-25 to V-18-45, adults emerged V and VI-19-45, W. C. Pierce. Grand Bayou (about 400 specimens, males and females): IV-5 to IV-22-44 and V-5 to V-22-44, on pecan trees, C. B. Nickels; IV-18-44, on pignut hickory trees, C. B. Nickels; III-31-45, overwintered adults on pecan trees in Beville orchard, W. C. Pierce. Abington (2 males, 4 females). Larvae in pecan shoots, IV-26-45, adults emerged V-29 to VI-1-45, W. C. Pierce. Lake Providence (6 males, 3 females): Ransdell orchard, larvae in pecan shoots, IV-20-45, adults emerged V-29 to VI-1-45, W. C. Pierce; overwintered adult on pecan tree, IV-20-45, W. C. Pierce. Mound (5 males, 6 females): Larvae in pecan shoots, IV-20-45, adults emerged V-29 to V-30-45, W. C. Pierce. Monroe (14 males, 18 females): Larvae in pecan shoots, IV-21-45, adults emerged V-29 to V-30-45; larvae in pecan shoots in Stubbs' orchard, IV-21-45, adults emerged V-29 to V-30-45; overwintered adults on pecan trees in Stubbs' orchard, IV-19-45. Natchitoches (3 males, 1 female): Larvae in pecan shoots, IV-28-45, adults emerged V-31 to VI-1-45. Shreveport (5 males, 16 females): On pecan, C. B. Nickels, spring 1944; overwintered adults on pecan in Bolinger orchard, IV-2-45, W. C. Pierce. Tallulah (4 males, 6 females): XI-15 to XII-1-43, in ground trash, R. C. Gaines; III-8 to III-15-44, in ground trash, M. T. Young; overwintered adults on pecan in McNelle orchard, IV-20-45, W. C. Pierce; larvae in pecan shoots in McNelle orchard, IV-20-45, adults emerged V-29 to V-30-45, W. C. Pierce. Baton Rouge (1 female): II-28, collection H. Soltau. Bell Chase (1 male); IV-13-45, on mulberry leaves, Whitmire. New Iberia (1 male, 5 females): VI-6-95, collection H. Soltau. Beauregard Parish (1 female): Larva in pecan shoot, V-21-45, adult emerged VI-19-45, W. C. Pierce.

Texas: "Tex.," 1 male. "Texas" (1 male): C. V. Riley collection. Victoria (4 males, 1 female): X-4, on pecan, E. A. Schwarz; VI-10-13, Quaintance No. 4632, on young green pecans, J. D. Mitchell; V-21-09, "bred leaf galls," J. D. Michell, 1 male. [This leaf gall record is doubtful. Specimens of *elegans* in the Museum collection bear identical pin-label data, and probably the larva which produced the male *pecanae* was not in a gall, but in a shoot, the leaf of which

may have been infested with galls of *elegans*.] San Antonio (12 males, 5 females): VI-22-95, VI-23-95, and VI-24-95, H. Saltau collection. Dallas (3 males, 1 female): IV-6-07, bred *Hicoria alba* petiole, Hunter No. 1384; III-6-08, on wild plum, Jones and Hood. Gustine (2 males, 2 females): VIII-30-44, on pecan, C. B. Nickels. Brownwood (2 females): III-20 to IV-7-44, on seedling pecan tree, W. C. Pierce.

The numerous specimens of *pecanae* at hand exhibit a wide range of individual variation and in a bewildering variety of fluctuating combinations. In equally extensive series from different localities, however, the variations, though doubtless never precisely the same, seem on the whole to be substantially similar in kind and range.

The foretibial modification in the male is occasionally feeble, but usually strong enough to be easily detected; the terminal position of the denticle on the hind uncus of the male is almost constant, and is probably the most distinctive single feature of the species. The tip of the aedeagus, in about 75 male genitalia examined, varies in shape within the limits shown in figures 39 to 47; in nearly all cases the apical lobe is decidedly more slender than in *tibialis* (figs. 36-38).

C. pecanae is most closely related to *tibialis* Schoof, and less so to *aratus* Germar. When the three are compared in series, *pecanae* is seen to be the smallest and apparently the stoutest, and *aratus* a little more slender than the other two.

NEW NORTH AMERICAN BELOMICRUS (Hymenoptera, Sphecidae)

BY V. S. L. PATE

Ithaca, New York

In the collection of the United States National Museum I recently discovered two new Nearctic species of the Oxyteline genus *Belomicrus*. Descriptions of these novelties are appended below.

Belomicrus maricopa,¹ new species

(Figs. 1, 2, 5, 6)

The sharply flanged prepectus and mesopleura and tuberculate mesosternum indicate that *maricopa* is a member of the Vanyume Group. The broadly excised lower mandibular margins, the hind coxal tooth, the emarginate hind trochanters, and the distinctive shape of the clypeus and pronotum read-

¹After the Maricopa Indians of Arizona.